A COMPARISON OF THE ACADEMIC ACHIEVEMENT OF SIXTY-FIVE EIGHTH GRADE BOYS AND SIXTY-FIVE EIGHTH GRADE GIRLS, AT FRANKLIN JUNIOR HIGH SCHOOL, DES MOINES, 1961

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Richard D. Rose

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Approved by Committee:

Simon Bartley
Chairman

Earle I Canfield
Dean of the Graduate Division

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INTRODUCTION

Each year across the nation parents, teachers, and administrators meet together in school conferences to discuss the problems of pupils. From these meetings, it is hoped that many of the problems faced by students can be solved.

One item stands out among the many problems. This is the fact that most of the problems are those which involve the male student. Why is this? Is there something wrong with the American boy? Are girls brighter than boys? Is there something wrong with the school systems? Are American schools girl centered?

I. THE PROBLEM

Statement of the problem. The purpose of this study was to compare academic achievement of sixty-five selected eighth grade boys from Franklin Junior High School, Des Moines, Iowa, with sixty-five selected eighth grade girls from the same school to determine the relationship of pupil sex to academic achievement.

Importance of the study. The male students who completed their elementary school education at Monroe Elementary,

Des Moines, had more problems than the students of the opposite sex. An examination of the school records, which dated back to 1918, revealed that: (1) Three hundred and fifteen boys had repeated (failed) a grade, while in the same period of time only fifty-six girls had repeated. This was a ratio of almost six failures among the boys to a single failure among the girls; (2) Seven times as many boys as girls had been referred for remedial help in reading and arithmetic; (3) In conduct, the boys had received five times as many poor ratings as the girls, while the girls had received over seven times as many excellent ratings as the boys; (4) More boys had received speech therapy than girls; and (5) More boys had been truant than girls. In the light of this discussion, a study to examine academic achievement of boys and girls at Franklin Junior High School seemed to be warranted. Disparities in achievement might have implications for the problem pupil situation as outlined.

II. SCOPE AND LIMITATIONS OF THE STUDY

The study was conducted in May of 1961, after the students at Franklin Junior High School, Des Moines, had completed the eighth grade achievement examinations. In conducting this study, the investigator examined the test record cards of the 623 eighth grade students at Franklin.

The cases selected for the study were determined by the mental ability of the students as indicated by scores made on the Otis Quick-scoring Mental Ability Test, Alpha Short Form, Grade Two. A deviation of two percentile points on the Otis Test scores was allowed for the selection of the boy-girl comparison groupings. The investigator examined the results of student achievement in the following areas: (1) spelling as indicated by the scores on the Stanford Achievement Test, Forms D and F, Spelling List at Grades Four, Five, and Seven; (2) reading achievement as indicated by scores on the California Achievement Tests, Forms W, X, Y, and Z, Elementary Battery Complete, Grade Three, the Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery Complete, Grade Five, and the Stanford Achievement Test, Form Km, Advanced Reading Test, Grade Eight; (3) language achievement as indicated by scores on the Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery, Complete, Grade Five; and (4) arithmetic achievement as indicated by scores on the Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery Complete, Grade Five and the Stanford Achievement Test, Form Km Advanced Arithmetic Test, Grade Eight. No case was selected unless the pupil had completed all the above-named tests. One hundred thirty cases or sixty-five boy-girl pairs met the above limitations and were used in this study.

III. METHOD OF STUDY

The research method pursued in this study was the descriptive survey, which involved the utilization of official records and tabulation of the data acquired.

Procedure. The following procedure was used in the process of carrying out and completing this study.

A survey of the literature pertinent to this study was made.

The purposes of the research were explained to the directors of elementary and secondary education and to the principals of the elementary and junior high schools involved.

The permanent test record cards of Franklin Junior High School and Monroe Elementary School, Des Moines, were utilized to secure the information necessary to make the comparisons of pupil sex to achievement.

The data secured from the official records were compiled in tabular form to show: (1) a comparison of the percentile scores received by boys and girls on the California Achievement Tests, Forms W, X, Y, and Z, Elementary Battery Complete, Grade Three; (2) the comparison of scores received by boys and girls in reading achievement as indicated by the Stanford Achievement Test, Forms J, K, L, M and N, Intermediate Battery Complete, Grade Five; (3) a comparison of

reading achievement by boys and girls as a result of their scores on the Stanford Achievement Test, Form Km, Advanced Reading Test, Grade Eight; (4) the comparison of boys and girls in spelling achievement as measured by the Stanford Achievement Test, Forms D and F, Spelling List, Grade Four; (5) a comparison of spelling achievement as indicated by the Stanford Achievement Test, Forms D and F, Spelling List, Grade Five; (6) a comparison of the results of boys and girls in spelling achievement as indicated by the Stanford Achievement Test, Forms D and F, Spelling List, Grade Seven; (8) a comparison of language achievement by boys and girls as revealed by the Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery Complete, Grade Five; and (9) tables were utilized to show comparisons of achievement in arithmetic as measured by the Stanford Achievement Test, Forms J, K, L, M and N, Intermediate Battery Complete, Grade Five, and the Stanford Achievement Test, Form Km, Advanced Arithmetic Test, Grade Eight.[1]

From the collected and tabulated data the following analysis was made: (1) Does sex make a difference in achievement? (2) Which sex ranks higher in achievement? (3) Is academic achievement by the sexes about equal? (4) Are there definite patterns of achievement between the sexes? (5) Does one sex dominate in academic achievement in any of the areas examined? and (6) Is there any area or period in which one sex indicates very rapid growth in achievement?

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[1]Appendix A.

A survey of the findings was reported and conclusions and recommendations were made as indicated by the investigation.

IV. SURVEY OF THE LITERATURE

There was much current literature to be found concerning the relationship of pupil sex to academic achievement. The following survey will be a review of some of the literature pertaining to pupil sex and academic achievement.

Language. Some of the reasons why boys have more problems than girls in school are quite evident. In the language area, this is very true. Ruth Strang, noted authority in child growth and development, made the following observations:

1. The female surpasses the male child in language growth.
2. Girls can be more readily understood at all ages than boys.
3. The vocabularies of girls exceed those of boys on entering school.
4. Girls excel boys in language development throughout the elementary school years.[1]

Strang's observations have implications which reveal why boys fail more often than girls. The boys at the very beginning of their school life are operating under a severe handicap, a language deficiency. Their vocabularies are not

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[1] Ruth Strang, Introduction to Child Study (New York: The Macmillan Company, 1952), pp. 320-321.

as large as that of the female. Not only is this deficiency with them at their entry into school but it persists throughout their school life. The girls can express themselves more clearly and their enunciation is better. Not being able to communicate as well as his female counterpart, the male is at a decided disadvantage. His teachers can not understand him as well as the girls. He can not express himself and his thoughts as clearly. Therefore, the boy with equal intelligence to a girl would not do as well academically and if operating under a severe language handicap could even be retained in a grade.

Reading. The language deficiency with which most boys begin elementary school has implications which carry into other subject matter areas. Reading is affected by language deficiencies. Many boys begin to read when less mature in linguistic development than girls. Therefore, many boys have more difficulties in reading than girls. Because of these difficulties, many boys are labeled non-readers, failed, or sent to remedial class.[1]

Boys in beginning reading face much frustration. Many are not ready to begin reading at age six. Many boys rely on their competitive instincts to keep up with the girls in their class.[2]

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[1] Ibid., p. 336.

[2] John R. Maxwell, "What to Do About the Boys?", National Education Association Journal, XLIX (March, 1960), 26.

A study by Anderson on reading revealed the following:

> A larger percentage of the boys actually learned to read at second-grade than at first-grade age. The boys outnumbered the girls at each of the latter ages of learning to read.
>
> The finding that girls tend to read sooner than boys is in harmony with the results of previous work. Studies have shown that girls not only get off to an earlier start, but that they also tend to retain their advantage through the grades. A related finding is that girls tend to excel boys on reading readiness tests. Still another discovery is that boys outnumber girls among reading disabilities. These sex differences are perhaps best explained by the fact that girls mature more rapidly than boys and hence become ready for reading sooner than boys.[1]

Handwriting. Boys are faced with many problems in school. Not only do they have an oral language deficiency in the communication area but they are also faced with a physiological deficiency which affects their written communication. Even if the male student has the oral language ability, he may develop poor or illegible handwriting due to inability to coordinate his small muscles because of muscular immaturity. A boy forced to begin writing before muscular maturity has been reached can become so frustrated that a mental block could arise against written communication.

Gates, in a report of a study of boys and girls, has pointed out that girls are "older" people than boys who have the same birth date. Generally, girls are one to one and

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[1] Irving H. Anderson, Byron O. Hughes, and W. Robert Dixon, "The Age of Learning to Read and Its Relations to Sex, and Intelligence," Journal of Educational Research, XLIX (February, 1956), 494.

one-half years ahead of boys as measured by the small wrist bones.[1]

The physiological advantage of the girls has definitely given the girls an advantage in handwriting. The handwriting of many boys is inferior in many cases to that of the girls.[2]

Behavior. Behavior problems are more prevalent among boys in school than girls. Boys receive fewer good ratings than girls and many more poorer ratings. Teachers observe far more problems in the behavior of boys than girls. Female teachers predominate the American school system.[3] This factor may influence the teachers' judgment of what behavior problems are.

Ullman's findings in his study of behavior in school pointed out the findings of Weinstein and Geisel. Ullman stated that: "Boys' patterns are more overt and manifest, while girls deal with their problems more intraphysically."[4]

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[1] Arthur I. Gates and others, Educational Psychology (New York: The Macmillan Company, 1949), pp. 52-54.

[2] Strang, op. cit., p. 377.

[3] Eugene A. Weinstein and Paul N. Geisel, "An Analysis of Sex Differences in Adjustment," Child Development, XXXI (December, 1960), 726-727.

[4] C. A. Ullman, "Identification of Maladjusted School Children," Public Health Monograph No. 7 (Washington: Federal Security Agency, Public Health Service, 1952), p. 36.

Ullman regarded this pattern as especially important in determining teachers' ratings of adjustment, concluding that:

> Teachers award girls more favorable ratings because they lack awareness of the manner in which girls are making their significant adjustments.[1]

Socialization processes in contemporary America are so arranged that expectations towards the behavior of girls tend to be more clearly defined and more consistent than is the case for boys.

A study by Weinstein and Geisel revealed that:

> Both access to appropriate adult identification models and opportunities for playing portions of their roles tend to favor the girls. In the family girls have more opportunities to interact with their mothers than boys do with their fathers. The pattern is about the same in the school situation. For boys, the most accessible adult models, such as mothers and teachers, are inappropriate. Too much interaction with mothers, for example, tends to be disapproved as "sissy-like" or being a "mama's boy." "Teacher's pet" or "brown nose" are the corresponding labels for the school situation. At the same time, boys are blocked from taking on significant portions of what is socially defined as appropriate male behavior, such as being aggressive, dominant, or exercising authority. A boy is not regarded "all boy" unless he exhibits some overt aggression although the situational opportunities are few and the situational limitations far from clear cut.[2]

The pressures of school are greater on boys than girls.[3] Because of greater pressures and not being as stable or mature emotionally, the male students are more prone to act or react

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[1] Ibid., p. 39.

[2] Weinstein and Geisel, loc. cit.

[3] Strang, op. cit., p. 344.

in manners not accepted as proper school behavior. Boys choose more active ways and means of releasing emotional pressures than girls.[1]

Recommendations from the literature. Many educators have written articles in school trade magazines and books pertaining to recommendations as to what can be done about the problems and difficulties which the male student faces to varying degrees in school. Most of the writers feel that there is a problem but not all agree as to the possible solutions. The following are summaries of the recommendations: Admit boys six months later than girls of the same age or admit the girls six months earlier than boys of the same age.[2] Devote more instructional time and materials exclusively to the boys. Organize the school classrooms, and curriculum in such a manner that any necessary adjustments based on individual differences of both sexes can be met.[3] Boys should begin school a full year later than five-year-old girls or not at least before the age of six.[4] The six-year-old girls should be grouped with the seven-year-old boys. The six-year-old boys should have a richly diversified activity program in school. During the

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[1] Ibid., p. 545.

[2] Maxwell, op. cit., p. 27.

[3] Gates and others, op. cit., p. 56.

[4] Maxwell, op. cit., p. 26.

year, the six-year-old boys should receive no formal training or instruction in arithmetic or reading. The formal training and instruction should be left until the following year when they are grouped with the six-year-old girls.[1] Mental ability differences by sex arise from environmental factors. Conditions in our environment, in our mores, in our schools, and in our customs develop the specific abilities of one sex to a greater extent than the other. These factors should be definitely recognized by the school administration and teachers. The necessary steps should be taken to provide an enriched program to compensate for such conditions and the degree to which they exist among the individual students.[2]

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[1]Daniel A. Prescott, Emotion and the Educative Process (Washington: American Council on Education, 1938), pp. 248-249.

[2]Wilbur W. Clark, "Boys and Girls: Are There Significant Ability and Achievement Differences," Phi Delta Kappan, XLI (November, 1959), 73-76.

CHAPTER II

A COMPARISON OF PUPIL SEX AND ACADEMIC ACHIEVEMENT

The data included in this study were obtained from official test record cards of the eighth grade students at Franklin Junior High School, Des Moines, Iowa.

I. SELECTION OF THE CASES

The cases for this study were selected on the basis of the mental ability of the students as determined by scores made on the Otis Quick-scoring Mental Ability Test, Alpha Short Form. This test had been taken in 1955 while the students were in second grade.

The test record cards of 623 eighth grade pupils at Franklin Junior High School were examined in May of 1961 to secure the boy-girl pairings. The boy-girl pairings for the study consisted of sixty-five boys and sixty-five girls with the same mental ability as determined by the scores made on the Otis Quick-scoring Mental Ability Test, Alpha Short Form. A deviation of two percentile points was allowed in the selection of each boy-girl comparison groupings.

Boy-girl pairings of mental ability. The figures in Table I present the boy-girl pairings of the students as determined by percentile ranks of the students on the Otis Quick-scoring Mental Ability Test, Alpha Short Form, Grade Two.

TABLE I

PAIRINGS OF 65 EIGHTH GRADE BOYS AND 65 EIGHTH GRADE GIRLS, FRANKLIN JUNIOR HIGH SCHOOL, DES MOINES, IOWA, MAY, 1961*

Case Number of Pair	Percentile Rank of Boy	Percentile Rank of Girl
1	5	5
2	10	12
3	16	14
4	18	18
5	20	19
6	21	21
7	24	24
8	26	26
9	29	29
10	33	34
11	35	35
12	36	36
13	36	37
14	36	38
15	39	39
16	39	39
17	39	39
18	39	39
19	39	39
20	43	43
21	43	43
22	46	46
23	46	46
24	46	46
25	50	48
26	50	49
27	50	50
28	50	50
29	50	50
30	50	50

*The pairings of the sixty-five boys and sixty-five girls were made on the basis of the percentile scores the pupil received on the Otis Quick-scoring Mental Ability Test, Alpha Short Form.

TABLE I (continued)

Case Number of Pair	Percentile Rank of Boy	Percentile Rank of Girl
31	50	50
32	52	51
33	54	54
34	54	54
35	54	54
36	54	54
37	54	54
38	58	58
39	58	58
40	58	58
41	58	58
42	60	60
43	62	62
44	62	62
45	62	62
46	62	62
47	62	62
48	63	63
49	64	64
50	64	64
51	64	64
52	67	67
53	68	68
54	68	68
55	72	72
56	76	76
57	78	78
58	80	80
59	81	81
60	82	83
61	85	85
62	86	86
63	88	90
64	92	90
65	98	98

There was a general tendency of the pairings to fall into the usual pattern of a Normal Curve. This tendency avoided the study from becoming unbalanced due to a predominance of pupils with extremely high or low mental ability. Three boys and three girls had mental abilities ranging from the fifth to the sixteenth percentiles. Seven boy-girl pairs fell between the eighteenth and thirty-fourth percentiles. Between the thirty-sixth percentile and the fiftieth percentile were twenty-one pairs. Forty-two cases or twenty-one boy-girl pairs were located between the fifty-first and sixty-seventh percentiles. Eight boy-girl pairs ranged between the sixty-eighth and the eighty-third percentiles. Ten pupils had mental ability percentiles between the eighty-fifth and ninety-eighth percentiles.

II. A COMPARISON OF THE PERCENTILE SCORES OF BOYS AND GIRLS IN READING ACHIEVEMENT

The official test records of the sixty-five pairs of boy-girl combinations were examined to determine if the sex of the pupil seemed to have any relationship to reading achievement. For this study the results of the following tests of reading achievement were selected: (1) California Achievement Tests, Forms W, X, Y, and Z, Elementary Battery Complete, Grade Three; (2) Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery Complete, Grade Five; and (3) Stanford Achievement Test, Form Km, Advanced Reading Test, Grade Eight.

Comparison of reading achievement at third grade. The percentile scores of the sixty-five boys and sixty-five girls obtained from the official test records as a result of the California Achievement Tests, Forms W, X, Y, and Z, Elementary Battery, Complete, Grade Three, were compared. The percentile scores were grouped in deciles.

Table II shows that a total of 42.5 per cent of the boys were below the fiftieth percentile in comparison with only 26.4 per cent of the girls. This left approximately 58 per cent of the boys in the area of the fiftieth percentile or above. In contrast, approximately 78 per cent of the girls ranked in the percentiles above the forty-ninth. Sixteen and eight-tenths per cent of the girls ranked above the ninetieth percentile, while only 10.5 per cent of the boys achieved this rank. Not a single girl and only one boy ranked below the tenth percentile.

The median percentile score for the boys was sixty and one-tenth. In comparison, the girls' median was seventy-one and four-tenths.

Comparison of reading achievement at fifth grade. Reading achievement scores on the Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery Complete, Grade Five were compared. This test was taken by the students in 1958. Again the percentile scores were arranged in deciles, as in Table II, and this procedure was followed throughout all subsequent tables.

TABLE II

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN READING ACHIEVEMENT, THIRD GRADE, 1956

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	7	10.5	11	16.8	18	13.9
80-89	8	12.3	15	23.0	23	17.7
70-79	10	15.4	8	12.3	18	13.9
60-69	8	12.3	10	15.4	18	13.9
50-59	5	7.7	4	6.1	9	6.9
40-49	7	10.8	8	12.3	15	11.5
30-39	10	15.4	5	7.7	15	11.5
20-29	8	12.3	2	3.2	10	7.7
10-19	1	1.5	2	3.2	3	2.3
0-9	1	1.5	0	0.0	1	0.7

Table III reveals thirty-three and nine-tenths per cent of the boys had scores below the fiftieth percentile, while 44.8 per cent of the girls scored in this area. This left 66.1 per cent of the boys and only 55.2 per cent of the girls in the fiftieth percentiles and above. Fifteen per cent of the boys were at the ninetieth percentile or above, while only 9 per cent of the girls had similar scores. Twelve and four-tenths per cent of the girls were in the area below the twentieth percentile in contrast to only 6.1 per cent of the boys.

The median percentile score of the boys was fifty-seven and two-tenths, while the median percentile score of the girls was fifty-two and seven-tenths.

TABLE III

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN READING ACHIEVEMENT, FIFTH GRADE, 1958

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	10	15.3	6	9.2	16	12.3
80-89	1	1.5	11	16.9	12	9.2
70-79	12	18.5	6	9.2	18	13.9
60-69	9	13.9	7	10.7	16	12.3
50-59	11	16.9	6	9.2	17	13.1
40-49	5	7.7	7	10.7	12	9.2
30-39	2	3.2	12	18.5	14	10.8
20-29	11	16.9	2	3.2	13	10.0
10-19	3	4.6	6	9.2	9	6.9
0-9	1	1.5	2	3.2	3	2.3

A comparison of eighth grade reading achievement scores. Comparison of the reading achievement scores of the boys was made with that of the girls at the eighth grade level. The scores were those received by the pupils in 1961. The Stanford Achievement Test, Form Km, Advanced Reading Test, was given in the latter portion of the eighth grade year.

The comparisons of data in Table IV regarding the reading achievement revealed the following: (1) Twelve and three-tenths per cent of the boys ranked at the ninetieth percentile or above. Fifteen and four-tenths per cent of the girls scored in the ninety to ninety-ninth percentiles; (2) The totals of boys and girls scoring in fiftieth percentile or above were

approximately the same, 63 per cent of the boys and 66.2 per cent of the girls; (3) Three, or approximately 5 per cent, of the boys had scores below the twentieth percentile as compared with five, or approximately 8 per cent, of the girls; (4) The median percentile score of the boys was sixty-two and seven-tenths in comparison to fifty-four and five-tenths for the girls.

TABLE IV

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN READING ACHIEVEMENT, EIGHTH GRADE, 1961

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	8	12.3	10	15.4	18	13.8
80-89	6	9.2	9	13.9	15	11.5
70-79	13	20.0	8	12.3	21	16.2
60-69	8	12.3	5	7.7	13	10.0
50-59	6	9.2	11	16.9	17	13.0
40-49	8	12.3	4	6.2	12	9.2
30-39	6	9.2	8	12.3	14	10.8
20-29	7	10.8	5	7.7	12	9.2
10-19	2	3.3	1	1.5	3	2.3
0-9	1	1.5	4	6.1	5	3.8

III. A COMPARISON OF THE PERCENTILE SCORES OF BOYS AND GIRLS IN SPELLING ACHIEVEMENT

The spelling achievement of the sexes was compared at three grade levels: grades four, five, and seven. At grade

five the spelling achievement section of the Stanford Achievement Tests, Forms J, K, L, M, and N, Intermediate Battery Complete, had been given. The pupils investigated in this study had taken the test in the following years: (1) fourth grade, 1957; (2) fifth grade, 1958; and (3) seventh grade, 1960.

Comparison of spelling achievement at fourth grade. A total of 39.9 per cent of the boys scored below the fiftieth percentile in comparison to 27.8 per cent of the girls as shown in Table V.

Ten of each the boys and girls ranked in the fifty to fifty-ninth percentiles. In the ninetieth and above percentiles, approximately 11 per cent of the boys scored compared to approximately 14 per cent of the girls in this grouping. The percentages of the girls and boys with scores in a particular percentile group were nearly the same except at two levels. There was a decided difference in percentages at the eighty to eighty-ninth percentiles and at the forty to forty-ninth percentiles. At the former, only 4.6 per cent of the boys were found in comparison to almost 14 per cent of the girls. In the forty to forty-ninth percentiles, 20 per cent of the boys were included. In comparison, at this level, there were only 1.5 per cent of the girls. Three and three-tenths per cent of the girls and no boys scored below the tenth percentile.

The median percentile scores for this test were: boys, fifty-seven; girls, sixty-four and five-tenths.

TABLE V

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN SPELLING ACHIEVEMENT, FOURTH GRADE, 1957

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	7	10.8	9	13.8	16	12.3
80-89	3	4.6	9	13.8	12	9.2
70-79	12	18.5	10	15.4	22	16.9
60-69	7	10.8	9	13.8	16	12.3
50-59	10	15.4	10	15.4	20	15.4
40-49	13	20.0	1	1.5	14	10.8
30-39	4	6.1	6	9.2	10	7.7
20-29	5	7.7	6	9.2	11	8.5
10-19	4	6.1	3	4.6	7	5.4
0-9	0	9.0	2	3.3	2	1.5

Comparison of spelling achievement at grade five. The data in Table VI show a comparison of the spelling achievement scores between the boys and girls at grade five. The scores were obtained from the results of the Stanford Achievement Test, Forms D and F, Spelling List.

From the data in Table VI the following relationships are shown: Fourteen or approximately 22 per cent of the boys were at the eightieth percentile or above while 23 or approximately 35 per cent of the girls had scores in these percentiles. The percentages of boys and girls in the percentiles below the twentieth were approximately the same. Twenty per cent of the girls had scores above the eighty-ninth percentile in contrast

to only 9.2 per cent of the boys. About the same percentages of boys and girls scored in the percentiles between the twentieth and forty-ninth.

The median percentile scores for the sexes in this test were: boys, fifty-seven and six-tenths; girls, sixty-eight and five-tenths.

TABLE VI

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN SPELLING ACHIEVEMENT, FIFTH GRADE, 1958

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	6	9.2	13	20.0	19	14.7
80-89	8	12.3	10	15.4	18	13.6
70-79	13	20.0	9	13.8	22	16.9
60-69	4	6.2	5	7.7	9	6.9
50-59	8	12.3	5	7.7	13	10.0
40-49	5	7.7	10	15.4	15	11.6
30-39	6	9.2	3	4.6	9	6.9
20-29	8	12.3	4	6.2	12	9.4
10-19	3	4.6	3	4.6	6	4.6
0-9	4	6.2	3	4.6	7	5.4

Comparison of spelling achievement scores at grade seven. The data in Table VII were obtained from the scores made on Stanford Achievement Test, Forms D and F, Spelling List, grade seven as recorded on the official test record cards of the students selected.

Twenty per cent of the girls had scores above the

eighty-ninth percentile in comparison to only 7.7 per cent of the boys. An almost equal percentage of boys 50.7 per cent, and girls 53.8 per cent, had scores in the percentiles, fifty through eighty-nine. Not a single boy was below the tenth percentile and only 3.1 per cent of the girls. Twenty per cent of the boys scored in the fortieth to forty-ninth percentile in comparison to only 4.6 per cent of the girls.

Girls' median score was seventy in comparison to sixty-one and eight-tenths for the boys.

TABLE VII

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN SPELLING ACHIEVEMENT, SEVENTH GRADE, 1960

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	5	7.7	13	20.0	18	13.9
80-89	9	13.8	9	13.8	18	13.9
70-79	10	15.4	11	16.9	21	16.1
60-69	11	16.9	8	12.3	19	14.6
50-59	3	4.6	7	10.7	10	7.7
40-49	13	20.0	3	4.6	16	12.3
30-39	7	10.8	8	12.3	15	11.5
20-29	4	6.2	2	3.1	6	4.6
10-19	3	4.6	2	3.1	5	3.9
0-9	0	0.0	2	3.1	2	1.5

IV. A COMPARISON OF THE PERCENTILE SCORES OF BOYS AND GIRLS IN LANGUAGE ACHIEVEMENT

The scores for language achievement as measured by a standardized test could only be obtained for grade five. The Des Moines School System has only one language achievement test in the first eight grades. This is the language section of the Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery Complete. No other language tests are given until high school.

Comparison of language achievement at grade five. The pupils selected for this investigation were tested for language achievement in 1958.

Twenty per cent of the girls scored above the eighty-ninth percentile in contrast to only 10.8 per cent of the boys as is shown in Table VIII. In the percentiles above the sixty-ninth, there were thirty-eight girls or 58 per cent, in comparison with twenty-three boys or approximately 33 per cent. Scoring between the sixtieth and sixty-ninth percentile were fourteen boys in comparison to only six girls. Seven and seven-tenths per cent of the boys had scores below the tenth percentile in contrast to only 4.6 per cent of the girls.

The median percentile scores were: boys sixty-two and seven-tenths and girls, seventy-three and two-tenths.

TABLE VIII

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN LANGUAGE ACHIEVEMENT, FIFTH GRADE, 1958

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	7	10.8	13	20.0	20	15.4
80-89	9	13.8	10	15.4	19	14.6
70-79	7	10.8	15	23.0	22	16.9
60-69	14	21.5	6	9.2	20	15.4
50-59	6	9.2	5	7.7	11	8.5
40-49	5	7.7	5	7.7	10	7.7
30-39	4	6.1	3	4.6	7	5.3
20-29	6	9.2	3	4.6	9	6.9
10-19	2	3.2	2	3.2	4	3.2
0-9	5	7.7	3	4.6	8	6.1

V. A COMPARISON OF PERCENTILE SCORES OF BOYS AND GIRLS IN ARITHMETIC ACHIEVEMENT

Through the first eight grades, arithmetic achievement by pupils of the Des Moines School System is tested at grades five and eight. These two tests of arithmetic achievement are given during the second semesters of the respective school years. The pupils investigated took the fifth grade examination in 1958 and the eighth grade examination in 1961. The fifth grade test was the arithmetic section of the Stanford Achievement Test, Forms J, K, L, M, and N, Intermediate Battery Complete. The Stanford Achievement Test, Form Km,

Advanced Reading Test, was used in the eighth grade examination.

Comparison of arithmetic achievement grade five. The data presented in Table IX show a comparison between the percentile scores of the boys and girls investigated in this study.

Twelve and three-tenths of the boys had scores above the eighty-ninth percentile while only 7.7 per cent of the girls had scores in these percentiles. At the zero to ninth percentiles, there were only 1.5 per cent of the boys in contrast to 6.2 per cent of the girls.

Median percentile scores were: fifty-four and five-tenths for boys and girls.

TABLE IX

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN ARITHMETIC ACHIEVEMENT, FIFTH GRADE, 1958

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	8	12.3	5	7.7	13	10.0
80-89	7	10.8	10	15.4	17	13.1
70-79	9	13.9	7	10.8	16	12.3
60-69	6	9.2	7	10.8	13	10.0
50-59	5	7.7	7	10.8	12	9.2
40-49	4	6.1	7	10.8	11	8.5
30-39	9	13.9	6	9.2	15	11.5
20-29	11	16.9	7	10.8	18	13.9
10-19	5	7.7	5	7.7	10	7.7
0-9	1	1.5	4	6.2	5	3.8

Comparison of arithmetic achievement at grade eight. A comparison of achievement in arithmetic by boys and girls is presented in Table X.

Only 3.2 per cent of the boys had scores above the eighty-ninth percentile while 9.2 per cent of the girls scored in this group. Approximately 11 per cent of the boys had scores at or below the tenth percentile as compared to only 4.6 per cent of the girls. In the percentiles above the fifty-ninth and below the ninetieth, thirty-one boys had scores in comparison with only seventeen girls. Fifteen boys or approximately 23 per cent had scores between the tenth and forty-ninth percentiles as did nineteen girls or approximately 25 per cent.

Sixty was the median percentile score of the boys in comparison to fifty-two and seven-tenths for the girls.

TABLE X

A COMPARISON OF PERCENTILE SCORES OF 65 BOYS AND 65 GIRLS IN ARITHMETIC ACHIEVEMENT, EIGHTH GRADE, 1961

Percentiles	Number of Boys	Per Cent of Boys	Number of Girls	Per Cent of Girls	Total Boys and Girls	Per Cent of Total
90-99	2	3.2	6	9.2	8	6.1
80-89	11	16.9	7	10.8	18	13.9
70-79	10	15.4	5	7.7	15	11.5
60-69	10	15.4	5	7.7	15	11.5
50-59	10	15.4	14	21.6	24	18.5
40-49	4	6.1	6	9.2	10	7.7
30-39	5	7.6	3	4.6	8	6.1
20-29	4	6.1	10	15.4	14	10.8
10-19	2	3.2	6	9.2	8	6.1
0-9	7	10.7	3	4.6	10	7.7

VI. SUMMARY

In summarization the comparisons of sex to academic achievement in reading, spelling, language, and arithmetic as indicated by this study the following was discovered:

The girls maintained a higher median score than the boys in third grade reading, in spelling at all three levels compared, and in fifth grade language. The median percentile score in third grade reading for the girls was seventy-one and four-tenths and the median percentile score for the boys was sixty and one-tenth. The median percentile score of the girls in spelling was: sixty-four and five-tenths, in fourth grade; sixty-eight and five-tenths in grade five; and seventy in grade seven. In comparison the median percentile scores of the boys in spelling at grades four, five, and seven were fifty-seven, fifty-seven and six-tenths, and sixty-one and eight-tenths, respectively. The median percentile score of the girls in language at fifth grade was seventy-three and two-tenths in comparison to the boys' median percentile score of sixty-two and seven-tenths.

The boys had higher median scores than the girls in only two areas, eighth grade reading and eighth grade arithmetic. The boys' median percentile score in eighth grade reading was sixty-two and seven-tenths in comparison to fifty-four and five-tenths for the girls. The median percentile score for the boys in eighth grade arithmetic achievement was sixty in

comparison to fifty-two and seven-tenths for the girls.

The median scores of the sexes were approximately equal in fifth grade reading and identical in fifth grade arithmetic. The median percentile score of the girls in fifth grade reading achievement was fifty-two and seven-tenths as compared to fifty-seven and two-tenths for the boys. In arithmetic achievement at grade five, both sexes had median percentile scores of fifty-four and five-tenths.

The girls, who had scores, in the ninetieth percentiles outnumbered the boys in a ratio of seven girls to two boys.

The number of boys and girls who had scores in the lower ten percentiles were approximately equal.

Girls had higher scores in spelling achievement than boys in all areas investigated.

Girls are ahead of boys in language achievement.

In reading achievement, the boys' achievement is not as high as the achievement of the girls in third grade, but at the fifth grade level, the achievement of the boys is approximately equal to that of the girls, and in eighth grade the boys exceed the girls in reading achievement.

At the fifth grade level, the arithmetic achievement of the sexes was approximately equal. The arithmetic achievement of the boys at grade eight was higher than that of the girls.

CHAPTER III

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to compare academic achievement of sixty-five selected eighth grade boys from Franklin Junior High School, Des Moines, with sixty-five eighth grade girls from the same school to determine the relationship of pupil sex to academic achievement.

The permanent test record cards of Franklin Junior High School and Monroe Elementary School, Des Moines, were utilized to secure the information necessary to make the comparisons of pupil sex to achievement. Comparisons of pupil sex and academic achievement were made at grades three, five and eight in reading; grades four, five and seven in spelling; grade five in language; and grades five and eight in arithmetic.

The pupils for this investigation were selected and paired, boy-girl, according to mental ability as determined by Otis Quick-scoring Mental Ability Test, Alpha Short Form, Grade Two. The attempt was made to pair the boys with girls of equal mental ability. A deviation of not more than two percentiles was allowed in the selection of the pairs. No pupil, who had not completed all of the achievement examinations in all areas compared, was allowed in the study.

I. SUMMARY

On the basis of the data obtained from the nine comparisons of pupil sex to academic achievement in four subject matter areas, the following relationships were found:

The girls maintained a higher median score than the boys in third grade reading, in spelling at all three levels compared, and in fifth grade language. The median percentile score in third grade reading for the girls was seventy-one and four-tenths and the median percentile score for the boys was sixty and one-tenth. The median percentile score of the girls in spelling was: sixty-four and five-tenths, in fourth grade; sixty-eight and five-tenths in grade five; and seventy in grade seven. In comparison, the median percentile scores of the boys in spelling at grades four, five, and seven were fifty-seven, fifty-seven and six-tenths, and sixty-one and eight-tenths, respectively. The median percentile score of the girls in language at fifth grade was seventy-three and two-tenths in comparison to the boys median percentile score of sixty-two and seven-tenths.

The boys had higher median scores than the girls in only two areas, eighth grade reading and eighth grade arithmetic. The boys' median percentile score in eighth grade reading was sixty-two and seven-tenths in comparison to fifty-four and five-tenths for the girls. The median

percentile score for the boys in eighth grade arithmetic achievement was sixty in comparison to fifty-two and seven-tenths for the girls.

The median scores of the sexes were approximately equal in fifth grade reading and identical in fifth grade arithmetic. The median percentile score of the girls in fifth grade reading achievement was fifty-two and seven-tenths as compared to fifty-seven and two-tenths for the boys. In arithmetic achievement at grade five, both sexes had median percentile scores of fifty-four and five-tenths.

The girls, who had scores in the ninetieth percentiles, outnumbered the boys in a ratio of seven girls to two boys.

The number of boys and girls, who had scores in the lower ten percentiles, were approximately equal.

Girls had higher scores in spelling achievement than boys in all areas investigated.

Girls are ahead of boys in language achievement.

In reading achievement, the boys' achievement is not as high as the achievement of the girls in third grade, but at the fifth grade level, the achievement of the boys is approximately equal to that of the girls, and in eighth grade the boys exceed the girls in reading achievement.

At the fifth grade level, the arithmetic achievement of the sexes was approximately equal. The arithmetic achievement of the boys at grade eight was higher than that of the girls.

II. CONCLUSIONS

After examining the data gathered from the comparisons of sex to academic achievement the following conclusions seemed justified:

1. Girls exceed boys in language and spelling achievement throughout the first eight grades.
2. Boys are behind girls in beginning reading achievement, are equal in reading achievement to girls in the intermediate grades, and exceed girls in reading achievement at grade eight.
3. In arithmetic achievement, boys and girls are equal at fifth grade but boys exceed girls in this area at the eighth grade level.

III. RECOMMENDATIONS

In view of the information resulting from this study, the following recommendations are herewith suggested:

1. Specific attention in language and spelling should be given to the boys throughout the first eight grades to enable them to overcome any language deficiencies which they might have.
2. Staff in-service meetings should be considered to acquaint teachers with the areas where pupil sex seems to be related to pupil achievement. Such meetings could also provide further information

and background for considering problem pupils.

3. Studies should be made to determine why sex appears to be more of a factor in some areas of academic achievement.
4. Consideration should also be given to studies comparing the sex factor in other areas of academic achievement and throughout the entire public school years of pupils.

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APPENDIX

APPENDIX A

Descriptions of Standardized Tests Used for This Study

OTIS QUICK-SCORING MENTAL ABILITY TEST, ALPHA SHORT FORM

The Otis Quick-scoring Mental Ability Test is a sampling of the child's experiences in both the verbal and the non-verbal areas. There are forty-five items in the sampling in each area. The test is devised for use in grades one through four.

The non-verbal part of the test requires the child to mark a horizontal line through the one picture, in a row of four pictures, which is different from the other pictures in the row. There is a twelve minute time limit on this part of the test. The non-verbal part of the test could be biased against the slow, methodical, perfectionist child.

The verbal part of the test requires the child to mark a vertical line through one picture, in each row of the four pictures, in accordance with specific directions. The non-verbal and verbal parts of the test use the same forty-five rows of four pictures per row. Since each direction is followed by an elapse of time, there should be a minimum of bias against the slow worker.

There is just one score for the total test, made from both the verbal and non-verbal scores. This total score is an indication of the child's level of performance, at the time the test was given, in the academic areas of school.

The total test score samples the child as to hearing, sight, ability to understand verbal instructions and ability to accurately perform according to verbal instructions.

CALIFORNIA ACHIEVEMENT TESTS Forms W, X, Y, and Z, Elementary Battery Complete, Grades 3, 4 and 5

The California Achievement Tests, Elementary Complete Battery, are printed in a thirty-three page booklet which includes six tests. The six tests sample the reading, arithmetic and language areas. The six tests have approximately one-hundred sixty minutes of testing. Therefore, more than two sittings are required for the entire battery.

The Reading Vocabulary Test is composed of fifty items, each of which consists of a key word, the word to be selected, and three other words. The pupil is asked to choose the word that means the opposite of the key word. The areas of mathematics, science, social studies and general vocabulary are all sampled.

The Reading Comprehension Test is composed of seventy items which are designed to reveal the pupil's comprehension of what he reads and to enable the teacher or counselor to make a diagnosis of specific difficulties which cause problems in reading. Following directions, reference skills and interpretation of material are the areas sampled.

The biases in each test could come because of poor reading, inability to hear or to follow directions, poor vision, and a psychological effect because the test booklet feels thick.

STANFORD ACHIEVEMENT TEST, Forms D and F, Spelling List

The Stanford Achievement Test, Spelling List, is an auditory test. The total test, which can be used from grade two through grade nine, has one hundred words. However, it is graduated as to starting and stopping points.

The make-up of the test is as follows:

1. the Has the bell rung yet? the

The teacher pronounces the word, reads the printed sentence which uses the word, and again repeats the word.

The second grade pupils take words 1 to 40; third grade pupils, words 1 to 50; fourth grade pupils, words 11 to 60; fifth grade pupils, words 21 to 70; sixth grade pupils, words 31 to 80; seventh grade pupils, words 41 to 90; and eighth and ninth grade pupils, words 51 to 100.

In each case as the teacher starts, he numbers the words from 1 to 50, except grade two which is 1 to 40.

The biases in this test could be caused by poor hearing, limited reading and limited experience.

STANFORD ACHIEVEMENT TEST, Forms J, K, L, M, and N, Intermediate Battery Complete

The Stanford Achievement Test, Intermediate Battery Complete, is printed in a twenty-four page booklet and includes nine tests. The total test is given in six different sittings or periods of time.

The nine tests are in the areas of paragraph meaning, word meaning, spelling, language, arithmetic, reasoning, arithmetic computation, social studies, sciences and study skills. The tests are designed to measure important knowledges, skills and understandings.

The test is so constructed that it is multiple choice throughout. All but the language section has one correct choice from the four possible choices. The language section has one correct choice from the two possible choices.

The study skills test samples the experiences in reading charts and tables, map reading, using the dictionary, sources and index.

The spelling test requires the child to look at three possible spellings of the same word. He then selects the correct spelling or marks in the column under "N.G." if none of the three possibilities is correct.

The other seven tests are the usual, as expected by the name.

The biases in this test could come because of poor reading, inability to accurately follow directions, poor vision and a psychological effect because the test booklet feels so thick.

STANFORD ACHIEVEMENT TEST, Form Km, Advanced Reading Test

The Stanford Achievement Test, Advanced Reading Test, samples the student in the paragraph meaning and word meaning areas.

The paragraph meaning section, with a twenty-five minute time limit consists of three pages of reading from which forty-four questions are to be answered.

The word meaning section, with a twelve minute time limit, consists of two pages, forty-six multiple choice statements. One answer of the four possible choices is correct.

The test is well balanced from one section to the other as far as possible points is concerned. Perhaps it is well balanced as to time because it will take each student considerably longer to read the paragraph meaning section than the word meaning section.

The biases in this test could be caused by poor vision, poor reading and narrow experiences.

STANFORD ACHIEVEMENT TEST, Form Km, Advanced Arithmetic Test

The Stanford Achievement Test, Advanced Arithmetic Test, samples the experiences of the student in arithmetic reasoning and arithmetic computation.

The arithmetic reasoning section consists of forty written problems. There is a twenty minute time limit.

The arithmetic computation section consists of sixty-five problems. There is a thirty minute time limit. Twelve of the sixty-five problems are written problems.

The total test is a fifty minute sampling in the areas of arithmetic reasoning and arithmetic computation. The test is weighted in the arithmetic computation area, both as to time and number of problems.

The biases in this test could be caused by poor vision, poor reading ability and experience.